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## Northeastern Section - 53rd Annual Meeting - 2018

Paper No. 57-2

Presentation Time: 8:00 AM-12:00 PM

### DECOMPRESSION INDUCED AMPHIBOLE BREAKDOWN IN LAVA DOMES ON DOMINICA, LESSER ANTILLES

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Dominica, an island in the Lesser Antilles volcanic arc, is home to nine active volcanic complexes, which have created dozens of lava domes, block and ash flows, and ignimbrite deposits since the Pleistocene. Our study focuses on the breakdown of amphibole at four lava domes on Dominica: Espanol ( $744 \pm 44$  ka), La Falaise ( $84 \pm 5$  ka), Canot ( $< 50$  ka), and Patates ( $510 \pm 9$  y). Espanol is on the northwestern coast, and the others are in the Plat Payes complex in the southwestern region of the island. All samples are andesitic-dacitic. Amphiboles from Espanol and Patates are characterized by thin, fine-grained reaction rims, while those from La Falaise and Canot exhibit complete breakdown. Six reaction textures were found in the four samples. Espanol and Patates each contain their own distinct thin rimmed texture, and Canot and Patates share the other four textures. All reaction textures consist of plagioclase, pyroxene, and oxides. Using oxide pair compositions found in the matrix, the reaction textures, and as inclusions in amphiboles, we determined the temperature of crystallization of the matrix and of amphibole crystals. Of the 735 temperatures found, only four were above  $1000^\circ\text{C}$ , the approximate upper temperature limit of the amphibole stability field in dacite. This allows amphibole breakdown to be attributed to decompression rather than heating. We propose that the samples with thin rims rose more quickly than those that were completely reacted, as more time spent outside of the amphibole stability field would allow for more complete breakdown of amphibole crystals. Plagioclase compositions confirm this hypothesis. Plagioclase in Espanol and Patates have compositions of  $\text{An}_{48-62}$  and  $\text{An}_{48-60}$ , while plagioclase in Canot and Patates have ranges of  $\text{An}_{40-66}$  and  $\text{An}_{46-68}$ , respectively. We believe that the larger ranges in plagioclase compositions observed in Canot and Patates are also due to slower ascent, as slower ascent increases time for nucleation at different depths. Additionally, amphiboles found in ignimbrite deposits show no visible reaction rim, confirming the correlation between ascent rate and rim size. There is a lack of spatial and temporal trends between samples that exhibit similar characteristics, suggesting that effusive volcanism on the island is changing over time and space.

Session No. 57--Booth# 26

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Tuesday, 20 March 2018: 8:00 AM-12:00 PM

Lake Champlain Exhibition Hall (DoubleTree by Hilton)

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